Formation Gas Pore Pressure Evaluation on drilling cuttings samples.

DESCRIPTION

Detailed description

[Para 1] Apparatus and process of this invention are provided for obtaining the specific properties of the drilled formation or any descried formation sampled. The apparatus and process for measuring the Formation Gas Pore Pressure on drilling cuttings samples in the test tube consist:

[Para 2] The Apparatus consist of vertical holder for test tube, test tube for placing the cutting sample and pipette for adding measurable quantity of liquid. (Note: "vertical holder for test tube and test tube" are disclosed in US application 10/711435 Horizontal Binocular Microscope for vertically gravitated and floating samples).

[Para 3] The process consist in measuring the gas bubbles size and volume in the test tube and the height of liquid covering the bubble. This we can calculate the volume and the pressure of the gas emitted out of the pores. The pore size is measured by the grain size of fraction in the test tube. As the sample is very fine grinded (by mortal and pistil) the size may be assumed as the statistic average of the mass. The size may be measured by sieving it and then taking the statistic average of the mass weight versus the sieve size. By applying the above method using 2-3 different sizes as necessary the high accuracy will be achieved. This initial volume of gas in pore and the final volume in test tube are related by $v1/p1=v2/p2$. If the size of grinded cuttings is the same (by mean) then the higher-pressure gas will create the bigger size bubbles. By repeating the test and adding/subtracting more liquid to the sample and increasing/decreasing the height and the pressure of the liquid on the pore the test is repeated and the measurements documented in the tables for math processing to obtain the error corrections and standard

deviation of the measurements. The results are expressed in Emission=V/P=mm3/Pa, Total Volume=V=mm3, Maximum Pressure=P=Pa.

Cross reference to related applications

[Para 4] References Cited: US patent application 10/711435 Kosta Zamfes September 17, 2004; US patent 6,386,026 B1 Kosta Zamfes May 14,2002.

Field of invention

[Para 5] The invention relates to apparatus and process for obtaining the Formation Pore Pressure form the drilling cuttings sample. This reflecting the physical and petrophysical properties of the formation drilled for Oil and Gas or other targets. These measurements are obtained at the surface. While drilling, the mudflow brings the cuttings to the surface and from the cuttings samples the process and apparatus of this invention are producing the information.

Background of invention

[Para 6] During the drilling of the well, mud is circulating downhill and brings up the formation cuttings of the strata penetrated at this time. After the lag time, which comprises of the annular velocity and the depth of the well, the cuttings arrive to the surface. At the surface the sample catcher devise, disclosed by the author in patented US 6,386,026 B1 May 14,2002, is capturing the material and at this time the apparatus and process disclosed in this invention are measuring the physical, physical-chemical and petrochemical properties of the formation.

Conventionally grinding the sample or steaming it and measuring the gas extracted by using Gas Detectors with catalytic combustion sensors do some of the cutting gas extraction. We disclose the ways to obtain the Emission=V/P=mm3/Pa, Total Volume=V=mm3, Maximum Pressure=P=Pa of the samples of the drilled strata.

Summary of invention

[Para 7] Apparatus and process of this invention are provided for obtaining the specific properties of the drilled formation or any descried formation sampled. The apparatus and process for measuring the Formation Gas Pore Pressure on drilling cuttings samples in the test tube consist:

[Para 8] The Apparatus consist of vertical holder for test tube, test tube for placing the cutting sample and pipette for adding measurable quantity of liquid. (Note: "vertical holder for test tube and test tube" are disclosed in US application 10/711435 Horizontal Binocular Microscope for vertically gravitated and floating samples).

[Para 9] The process consist in measuring the gas bubbles size and volume in the test tube and the height of liquid covering the bubble. This we can calculate the volume and the pressure of the gas emitted out of the pores. The pore size is measured by the grain sieve of fraction in the test tube. As the sample is very fine grinded (by mortal and pistil) the size may be assumed as the statistic average of the mass. This initial volume of gas in pore and the final volume in test tube are related by v1/p1=v2/p2. By adding/subtracting more liquid to the sample and increasing/decreasing the height and the pressure of the liquid on the pore the test is repeated and the measurements documented in the tables for math processing to obtain the error corrections and standard deviation of the measurements. The results are expressed in Emission=V/P=mm3/Pa, Total Volume=V=mm3, Maximum Pressure=P=Pa.

Brief description of the drawings

[Para 10] Fig 1. A schematic of measuring the size and the height of the bubble in the test tube.

[Para 11] Fig 2. The picture of the bubbles in the test tube.